

Comparison of RPR 'teardrop' card test, VDRL, and FTA-ABS test results on sera from persons with suspected yaws in Colombia

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SUMMARY A small study comparing results of the rapid plasma reagin (RPR) teardrop card test performed in the field, with results of Venereal Disease Research Laboratory (VDRL) and fluorescent treponemal antibody absorption (FTA-ABS) tests performed in the laboratory on venous blood specimens from the same suspected yaws patients was undertaken in Colombia in July 1975. The results suggest that the RPR teardrop card test may be used to screen for infectious, or potentially infectious, yaws patients under field conditions, but that it will not reliably detect patients with VDRL titres of 1:2 or less, or all patients in whom sera are reactive in the FTA-ABS test.

Introduction

Results of the rapid plasma reagin (RPR) teardrop card test performed under field conditions was studied during an assessment of yaws in Colombia in the summer of 1975. At that time, Colombian field workers depended almost exclusively on clinical appearance of test-of-cure with penicillin (1–3 doses) to diagnose yaws. The main purpose of the study was to investigate the value of the RPR teardrop card test in the diagnosis of yaws in remote Colombian villages. The results of this small study are reported here as there have been few published reports giving data on this subject and the RPR teardrop card test is potentially useful for serological investigation in rural areas where yaws is endemic. There has been an ominous resurgence of yaws in some countries (Hopkins, 1976).

Methods and materials

Sera tested were from persons in whom yaws was suspected on clinical grounds by field workers in the Colombian anti-yaws campaign, or from contacts of suspected cases. Eighty-four per cent (54/64) of

the suspected cases lived in rural communities along the southern part of Colombia's Pacific coast. The other 16% lived in a large port on the same coast. Twenty-five of the suspected cases were children under 16 years. Yaws is still endemic in this area, although at low levels. Except for syphilis in the port city, venereal syphilis and pinta are rare or non-existent in these communities. Malaria is prevalent.

RPR teardrop card test kits were purchased from Hynson, Wescott, and Dunning.* Test materials were usually refrigerated overnight, but in rural areas were kept at ambient tropical temperatures (about 25–35°C) for two and a half weeks. RPR card tests were performed by one of the authors in accordance with instructions in the kit, usually in patients' homes, using finger-prick blood samples. For a few RPR tests, we used sera from venepuncture blood samples drawn the same or the previous day.

Venous blood samples were taken from 72 of 87 persons tested with the RPR card test, but eight contaminated samples were discarded. VDRL and FTA-ABS tests were performed, using standard methods, by Dr Miguel A. Guzman's laboratory in the Instituto Nacional Para Programas Especiales de Salud in Bogota. Quantitative Venereal Disease Research Laboratory (VDRL) and fluorescent treponemal antibody absorption (FTA-ABS) tests were performed only on sera which were reactive or weakly reactive by qualitative VDRL. FTA-ABS tests were reported as reactive or non-reactive.

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Results

Results are summarised in Tables 1, 2, and 3. Eighty-four per cent (16/19) of persons in whom serum was reactive in the RPR test also had reactive VDRL tests. Of the 45 persons with non-reactive sera in the RPR test, 38% (17/45) were also VDRL non-reactive, 36% (16/45) had weakly reactive VDRL reactions with undiluted sera, and 26% (12/45) were VDRL reactive. Eleven of the 12 sera which were RPR non-reactive in the VDRL test were VDRL reactive only when undiluted; the other had a VDRL titre of 1:2.

Table 1 Comparison of RPR and VDRL tests

RPR	VDRL						Total reactive	Total
	Non-reactive/weakly reactive	1:1	1:2	1:4	1:8	1:16+		
Non-reactive	17/16	11	1	—	—	—	12	45
Reactive	2/1	2	4	5	2	3	16	19
Total	19/17	13	5	5	2	3	28	64

Table 2 Comparison of RPR and FTA-ABS tests

RPR	FTA-ABS		
	Non-reactive	Reactive	Total
Non-reactive	12	16	28
Reactive	1	17	18
Total	13	33	46

Table 3 Comparison of VDRL and FTA-ABS tests

VDRL	FTA-ABS		
	Non-reactive	Reactive	Total
Non-reactive	9	8	17
Reactive	2	35	37
Total	11	43	54

Results of RPR card tests agreed with FTA-ABS results in 29 of 46 sera (63%). Of the 16 sera which were RPR non-reactive and FTA-ABS reactive (false negative), seven had only weakly reactive VDRL reactions, and the other nine sera were VDRL reactive only when undiluted. The only patient with a false positive reaction (RPR reactive, FTA-ABS non-reactive) had a weakly reactive RPR card test which was negative when repeated.

Seven of the patients tested had clinically active yaws. All three tests were reactive in each of these seven patients.

Discussion

The RPR card test was introduced in 1962. The 'teardrop' variant of this test permits workers to test sera quickly from finger-prick blood samples for VDRL-type antibody in the field, giving a result which is read macroscopically with the naked eye. The RPR teardrop card test has been used for field studies of yaws and syphilis in tropical areas, and a few authors have compared its results with standard VDRL and/or Reiter protein complement-fixation tests. We know of only one published study in which results of RPR teardrop tests, VDRL, and FTA tests on the same sera have been compared, and this was on patients with syphilis, malaria, or leprosy and not yaws (Buck and Mayer, 1964). Ashcroft *et al.* (1965) noted generally greater agreement between the RPR teardrop card test and VDRL tests than between the RPR and Reiter protein complement-fixation test results in a survey of Jamaican patients with yaws. Gan *et al.* (1973) working in Aruba, found the VDRL more sensitive than the RPR teardrop test, detecting additional syphilitic seroreactors in those whose VDRL titres were usually only 1:1 or 1:2. Buck and Mayer (1964) reported excellent agreement between RPR and FTA-50 tests in sera from patients with syphilis, 'control' subjects, and other Ethiopian patients with lepromatous leprosy, but poor agreement in patients with tuberculoid leprosy and in patients from an area where malaria was hyperendemic.

Our results appear to confirm the value of the RPR teardrop card test for screening patients in whom yaws is suspected. False positive RPR results were infrequent in this trial, an interesting finding in view of the presumed presence of malaria and other infections which may produce cross-reacting lipoidal antibodies in patients in tropical areas (United States Public Health Service, 1968). Pampiglione and Wilkinson (1975) also found few false positive VDRL results in comparison with FTA-ABS results in yaws endemic areas of Cameroon and Zaire. The specificity of the FTA-ABS test among tropical populations is now also being questioned by some workers (Sparling, 1971; World Health Organisation, 1974).

Our false negative RPR results confirm that the VDRL and FTA-ABS tests are more sensitive than the RPR teardrop card test. However, all the persons whose sera gave false negative results in the RPR test had VDRL titres of 1:2 or less, and all persons with VDRL titres of 1:4 or more were reactive in the RPR test. Since yaws patients with VDRL titres of 1:16 and greater are more likely to be infectious or potentially infectious (Hackett, 1960), the RPR test in this series detected those

patients with yaws who were potentially dangerous from the public health viewpoint. In that sense, the relative insensitivity of the RPR test might be considered advantageous for yaws field workers by focusing attention where it should be (Hopkins, 1976).

This limited study suggests that the RPR teardrop card test may be used to screen for infectious or potentially infectious yaws patients under field conditions, but that it will not reliably detect all patients with VDRL titres of 1:2 or less or those in whom sera are reactive in the FTA-ABS test. Ideally the RPR teardrop card test should be used in conjunction with a portable darkfield microscope to diagnose yaws in rural areas, perhaps with FTA-ABS tests being performed as necessary on blood specimens collected on filter paper (Hopkins, 1977).

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